

FIG. 3A

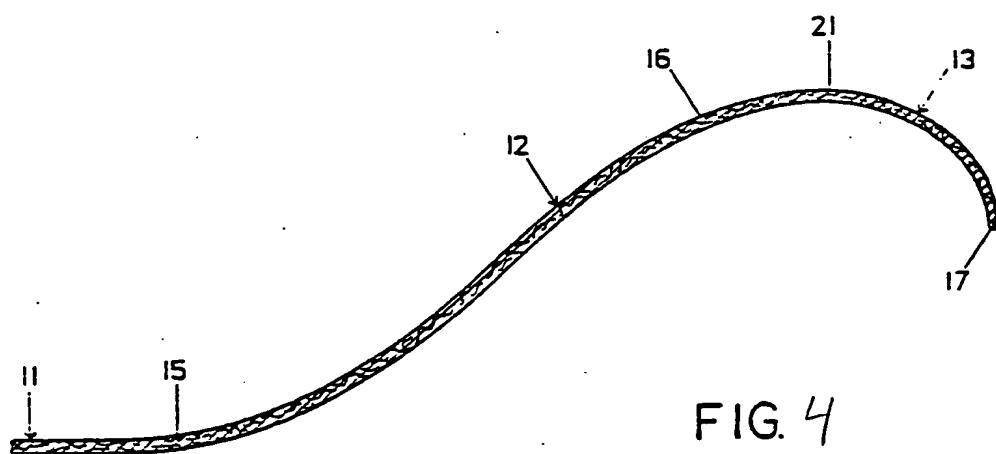


FIG. 4

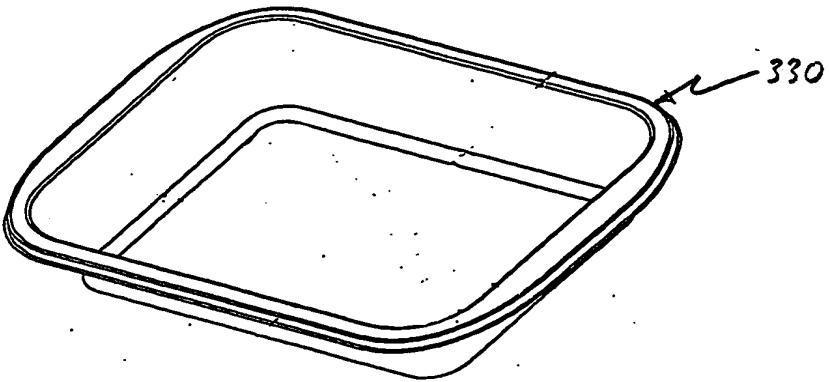


Fig. 3B

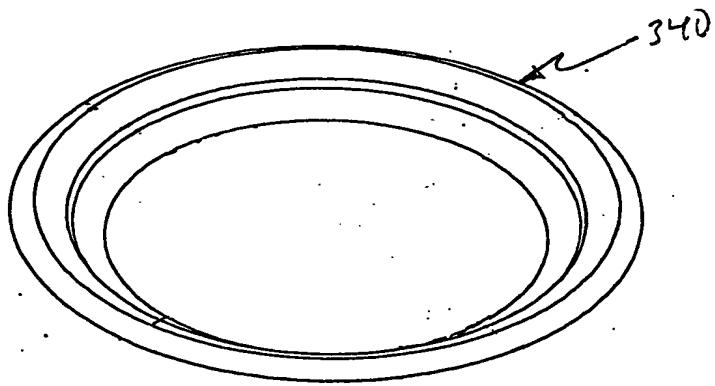


Fig. 3C

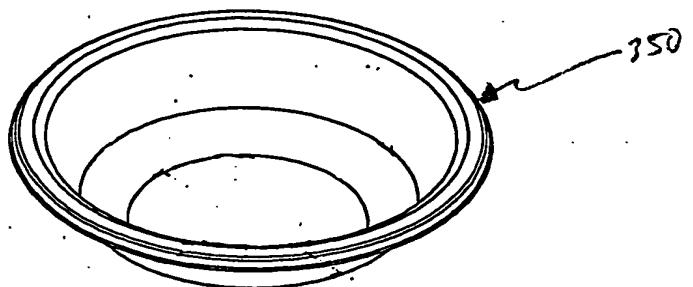
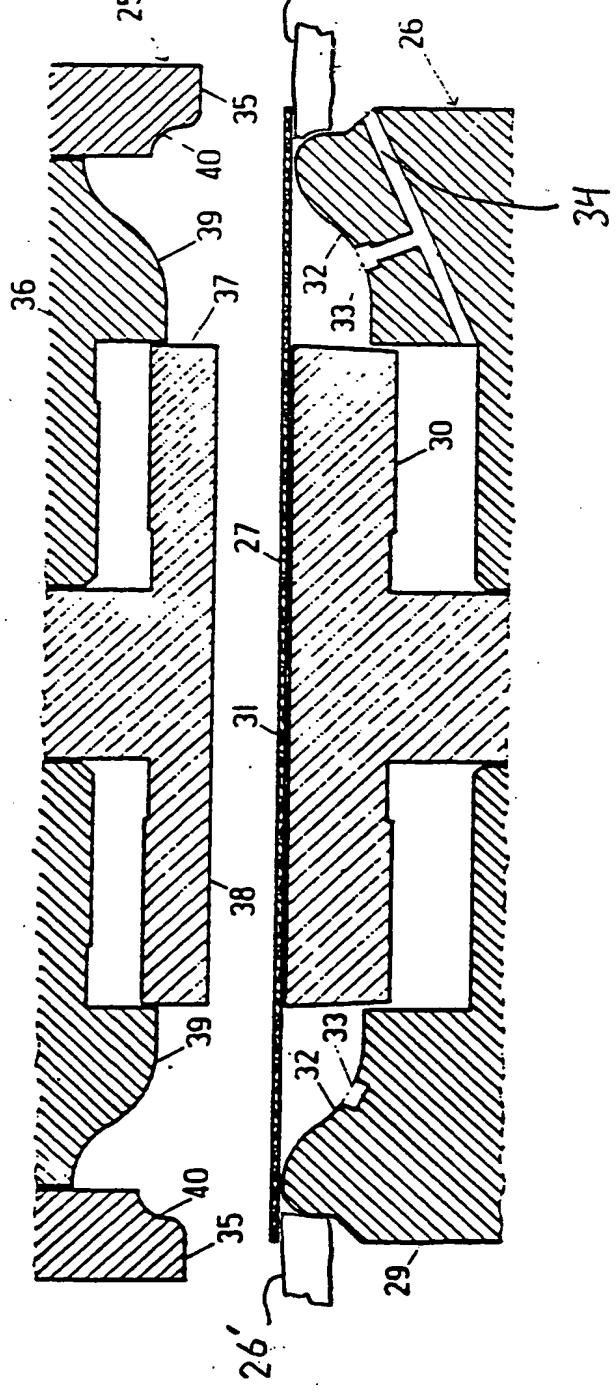


Fig. 3D

FIG. 5



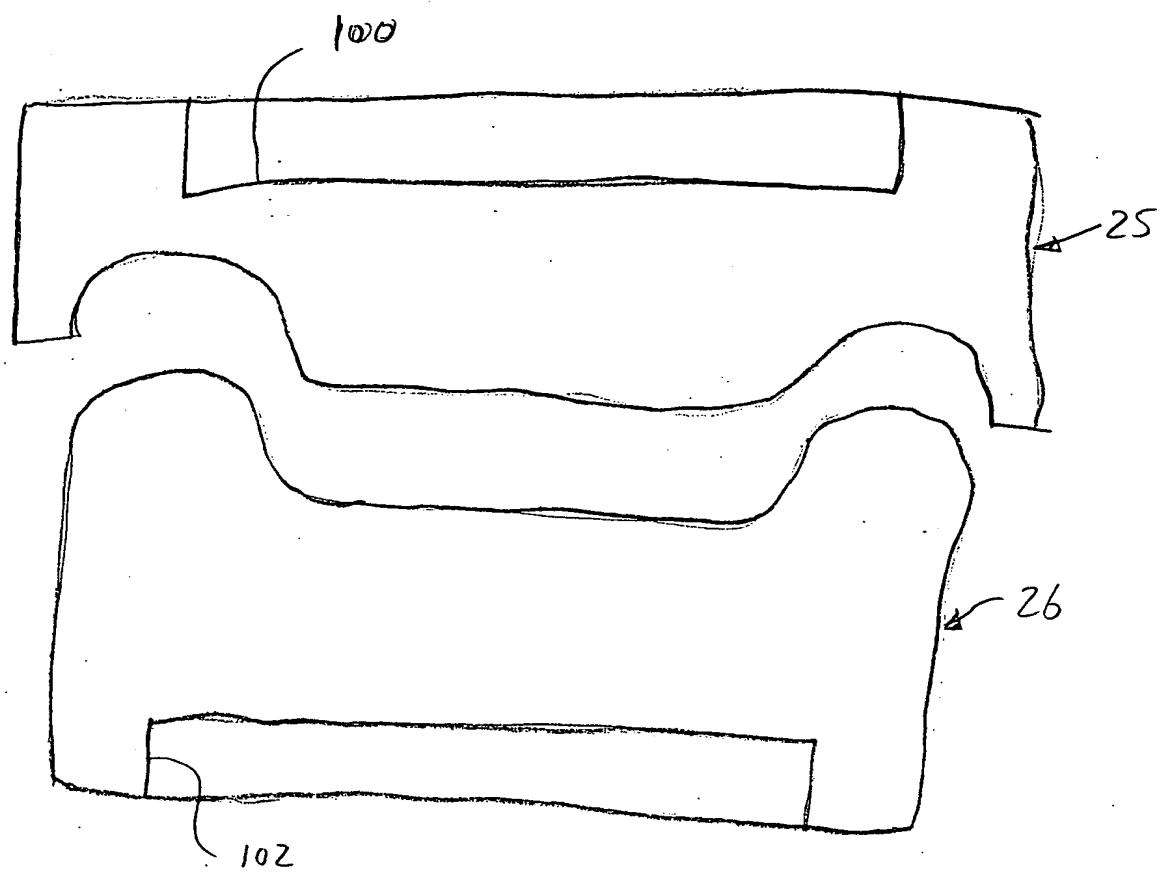


Fig. 6

Fig. 7

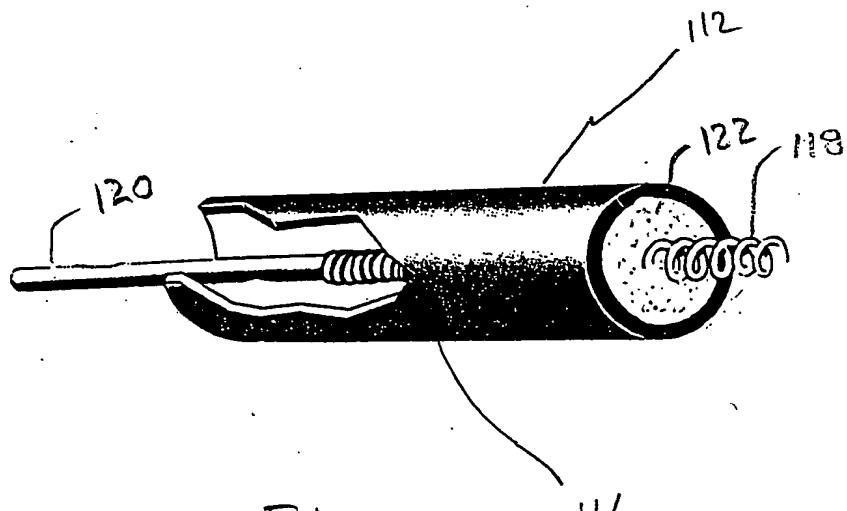
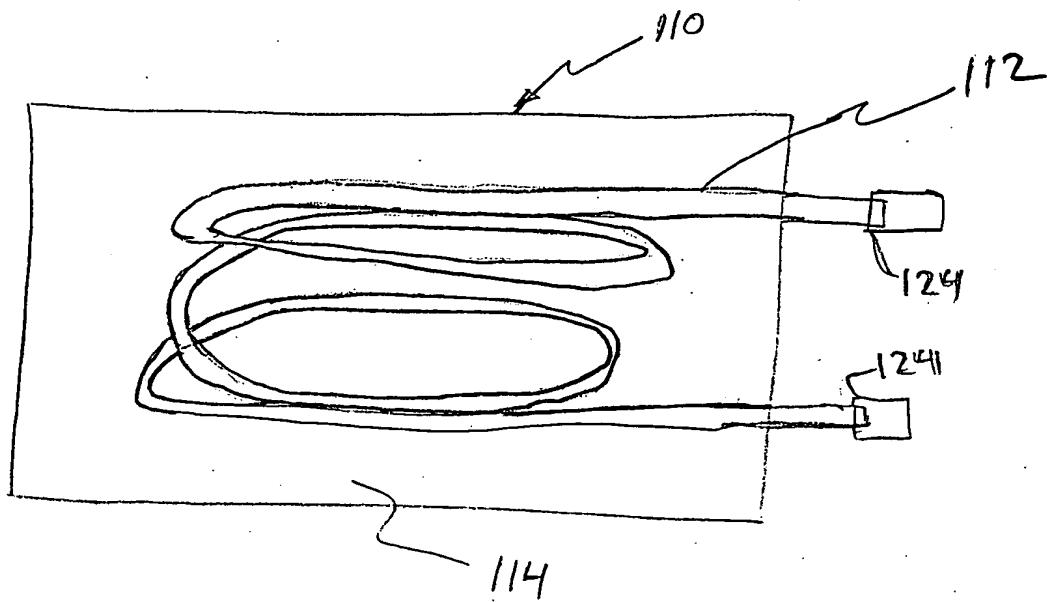


Fig. 8

Fig. 10

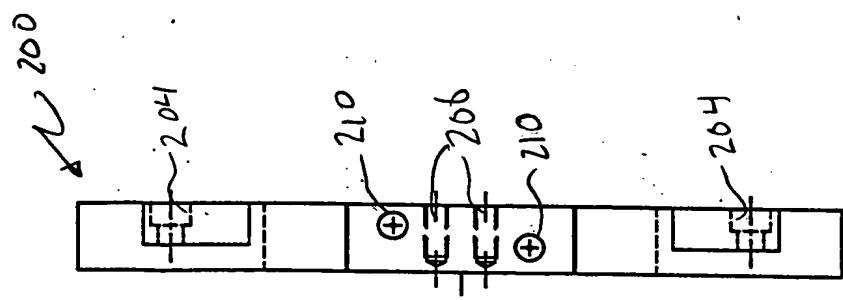
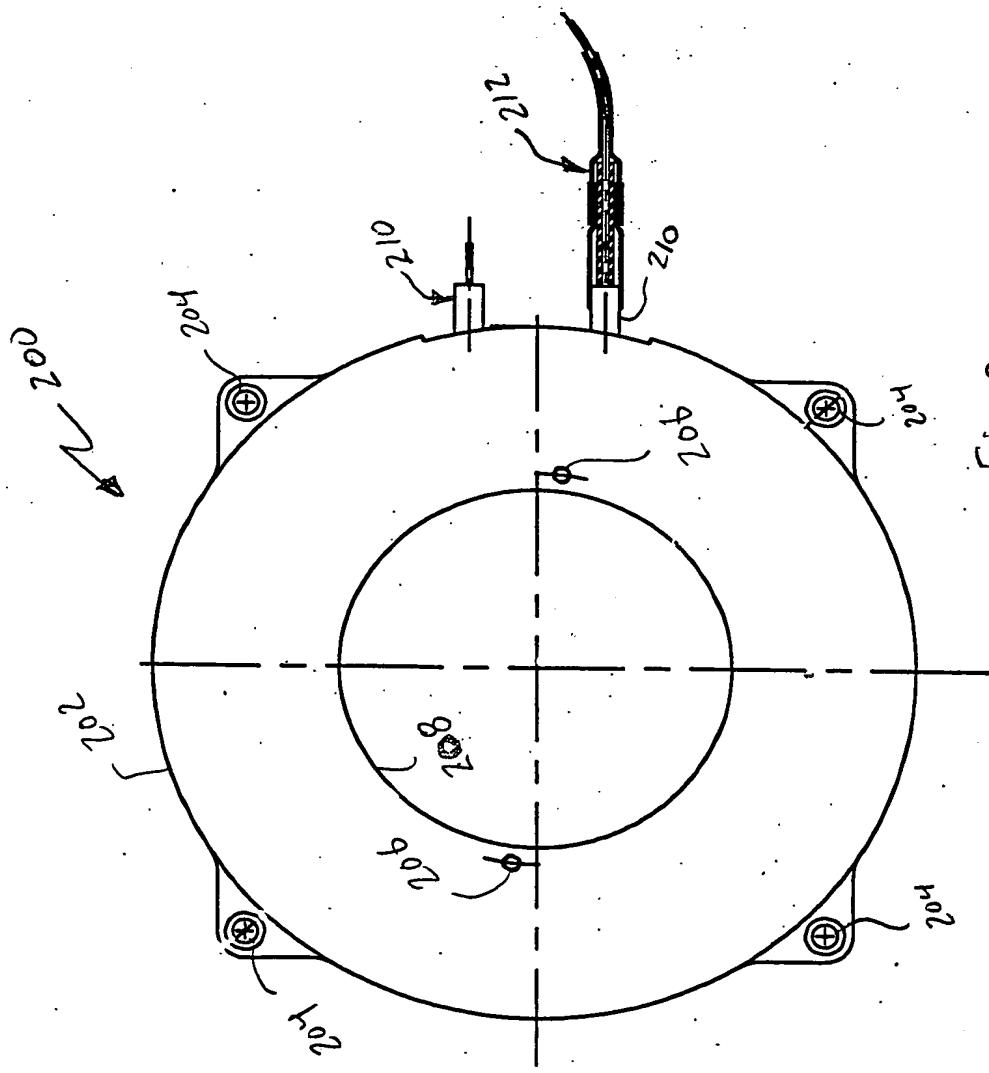
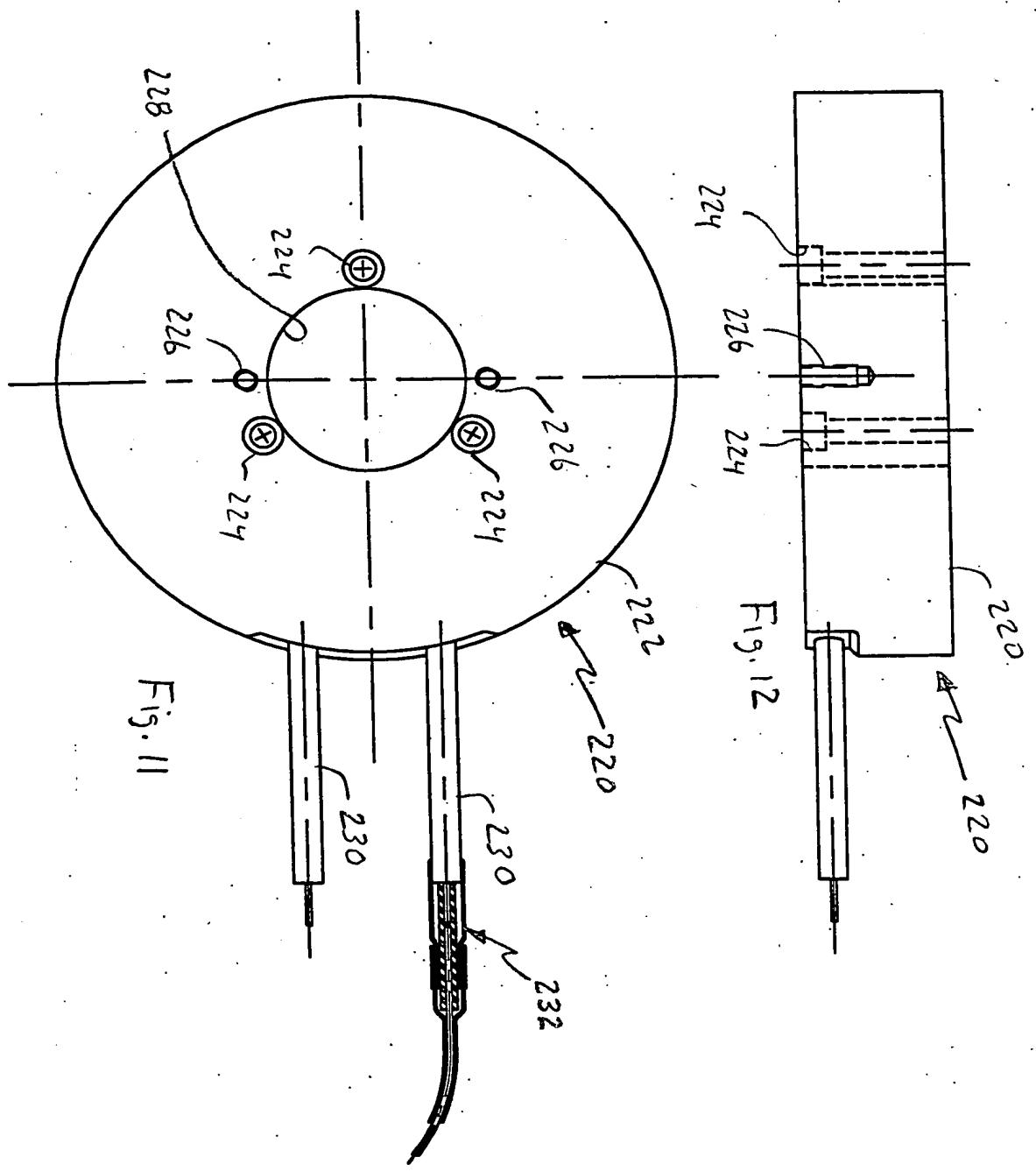
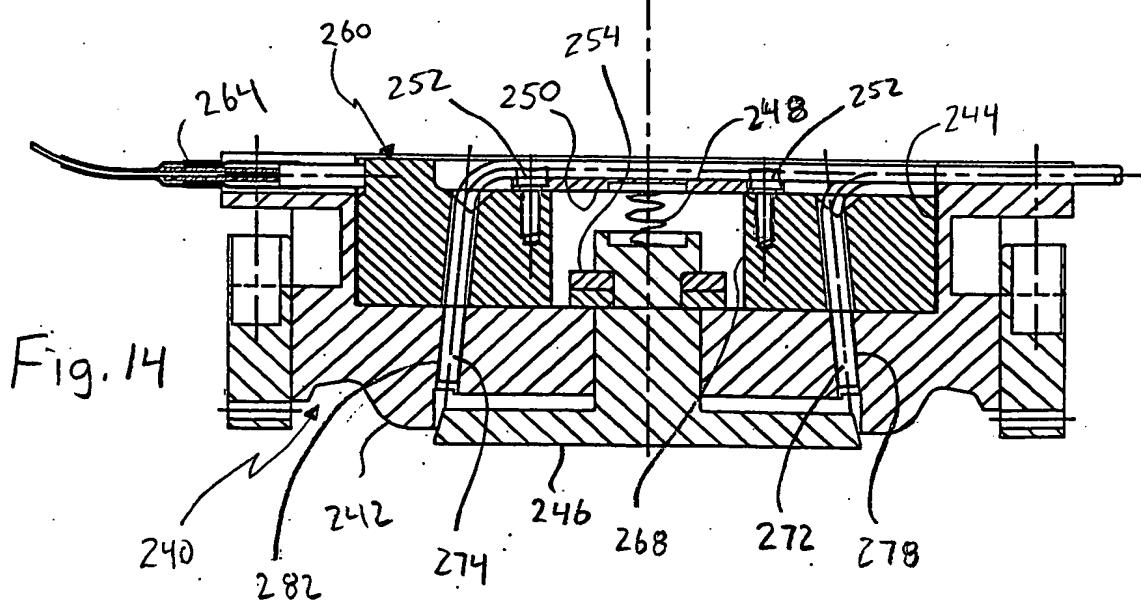
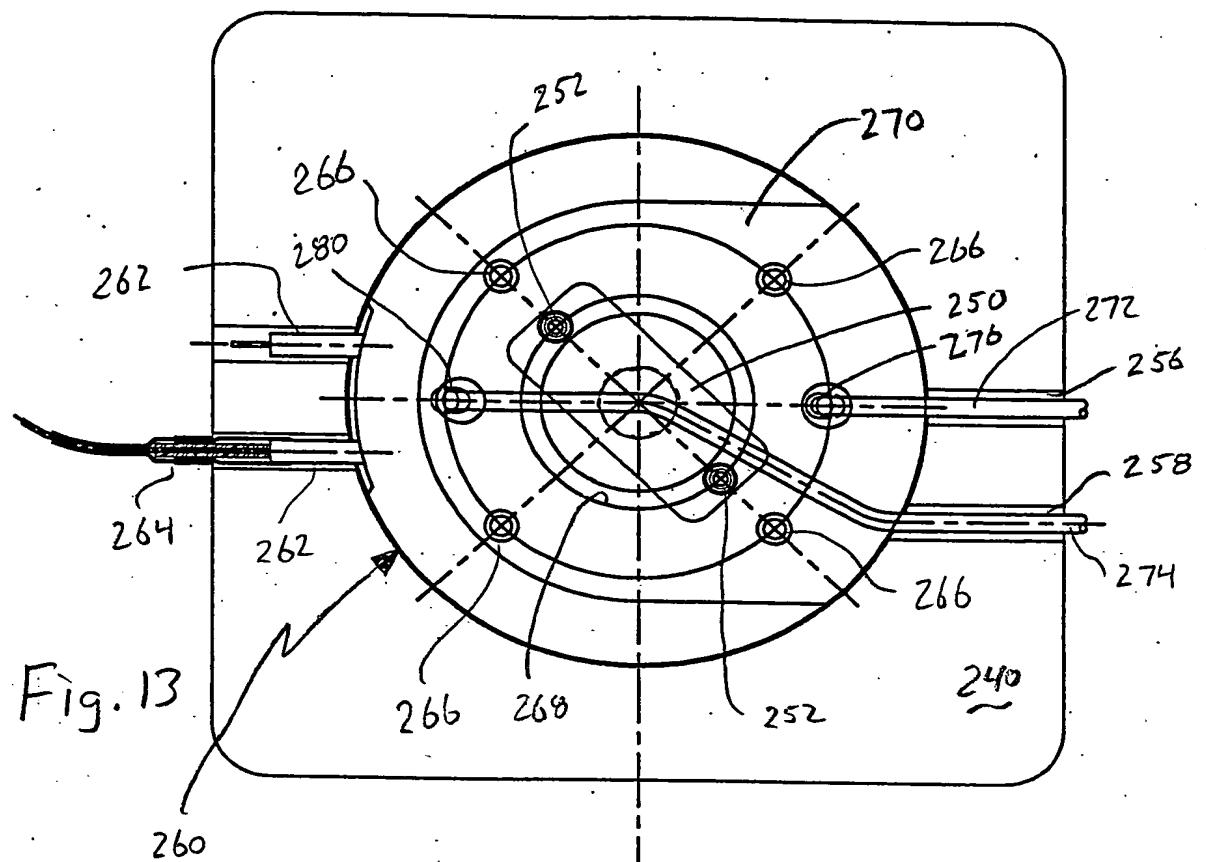


Fig. 9







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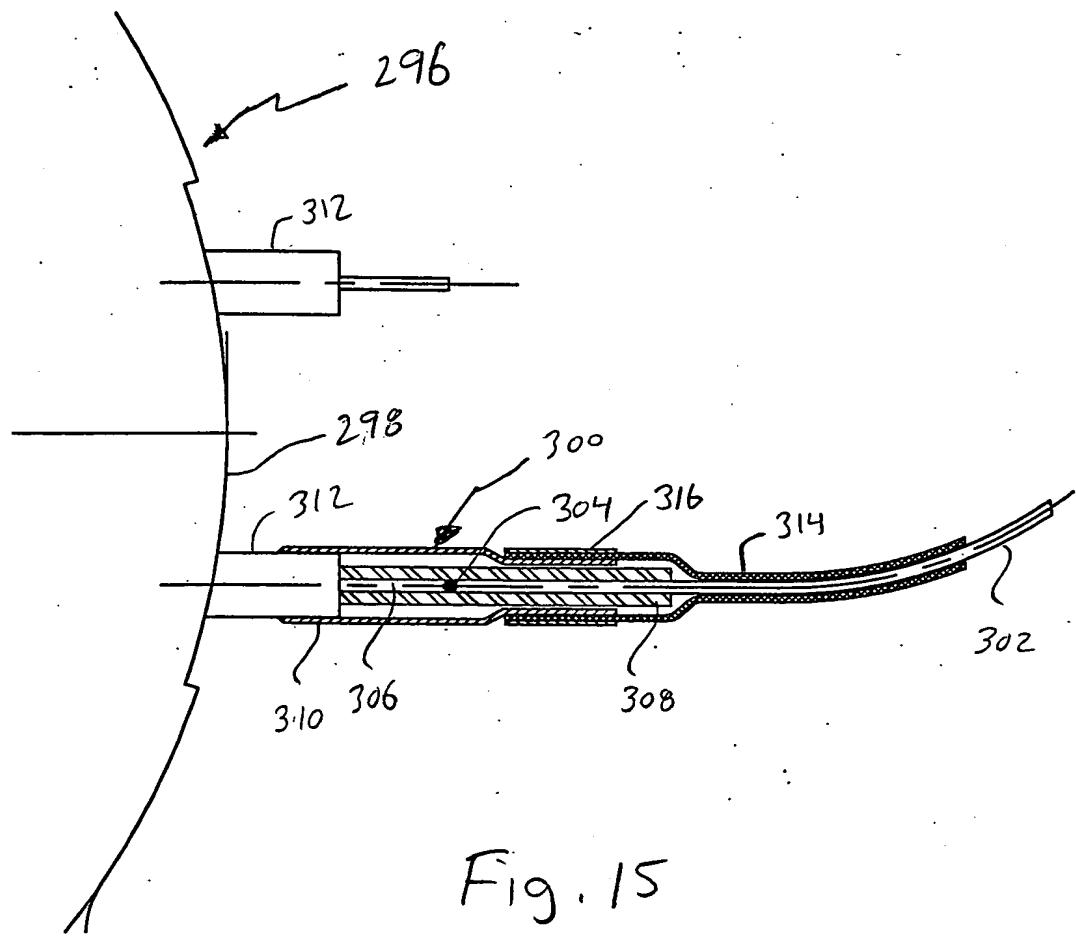


Fig. 15

Ring Heaters - 320 F. Production and Shutdown

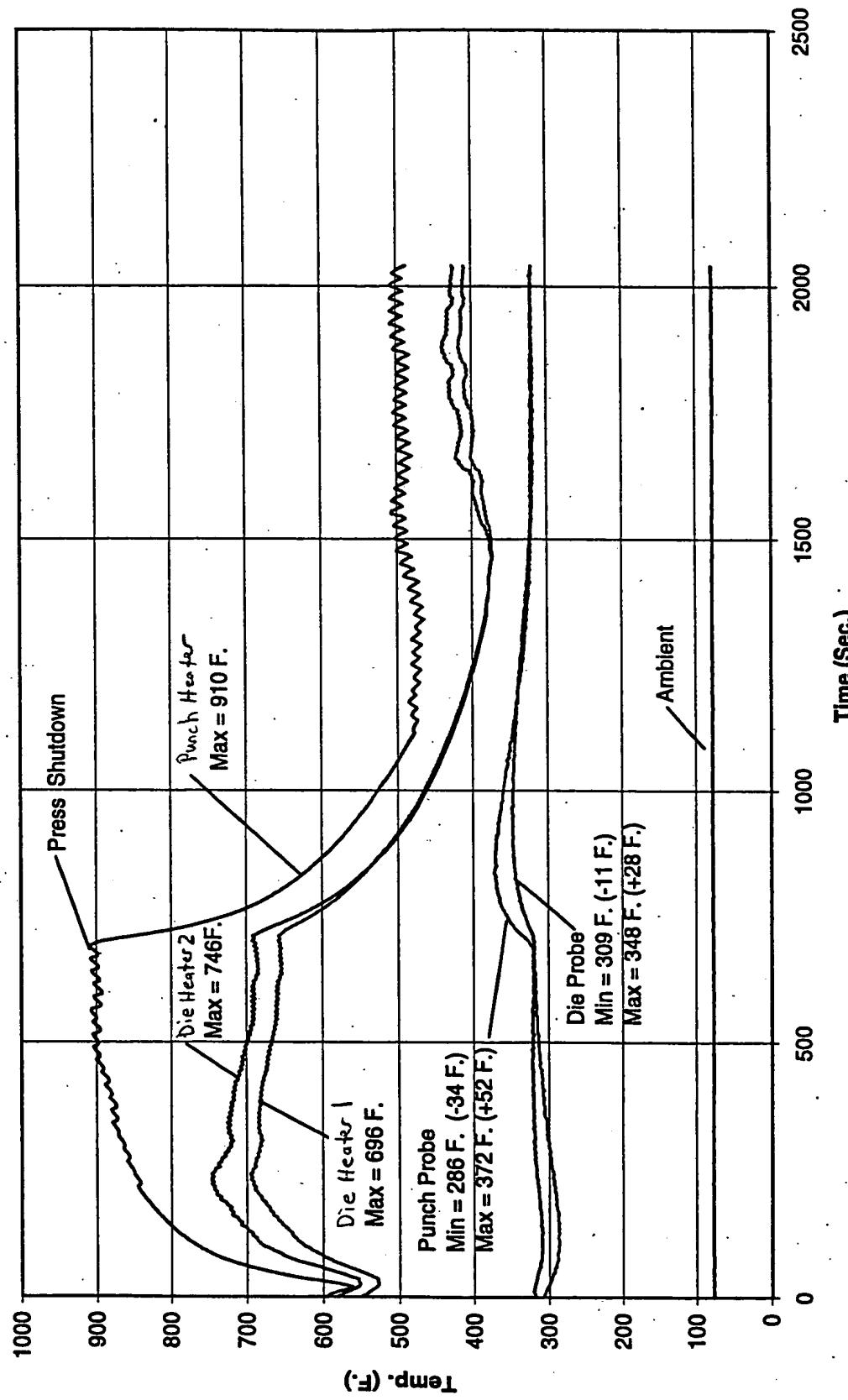


Fig. 16

Ring Heaters - 320 F. Std. Heat Up

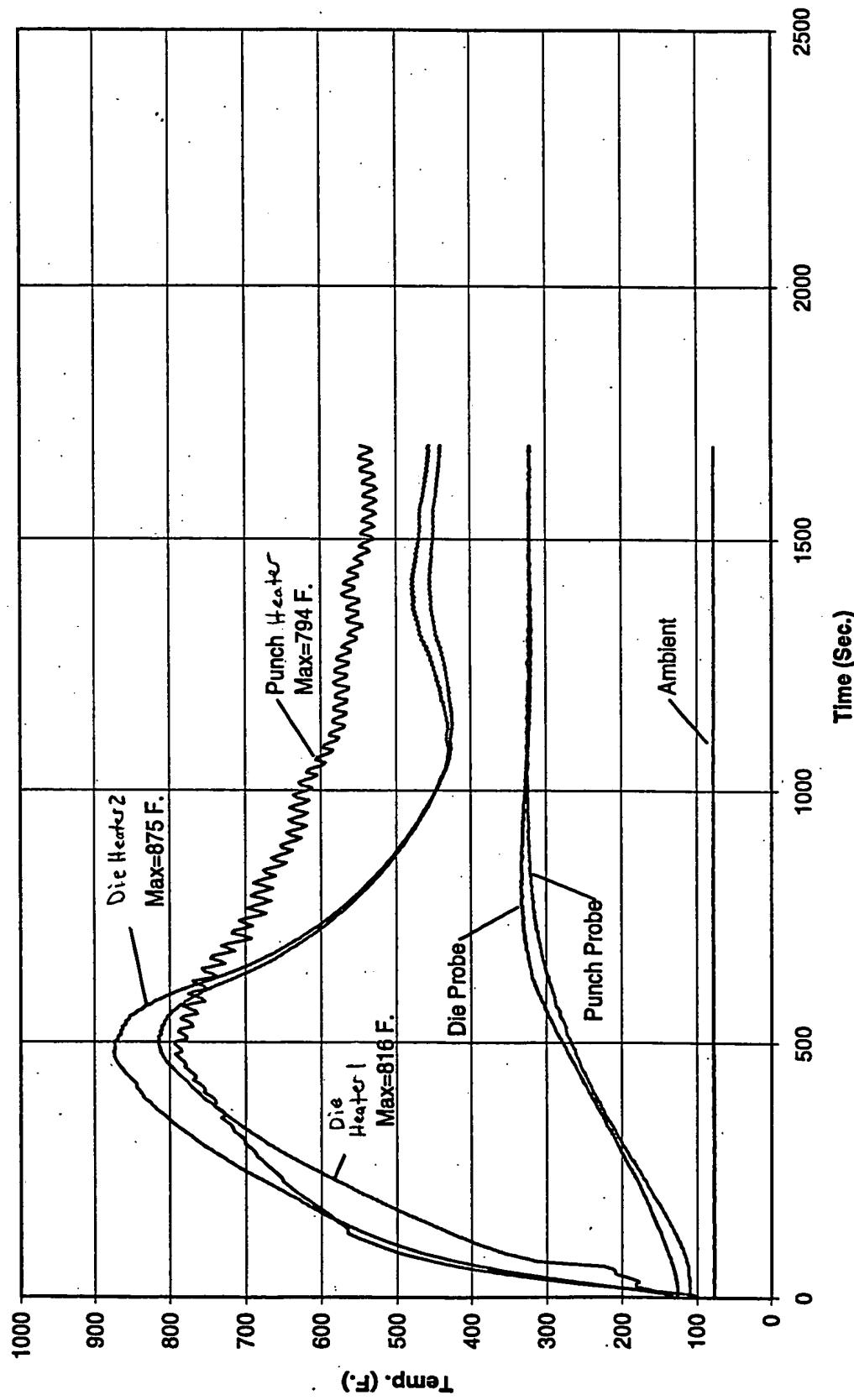


Fig. 17

Cast-In Heaters - 320 F. Production and Shutdown

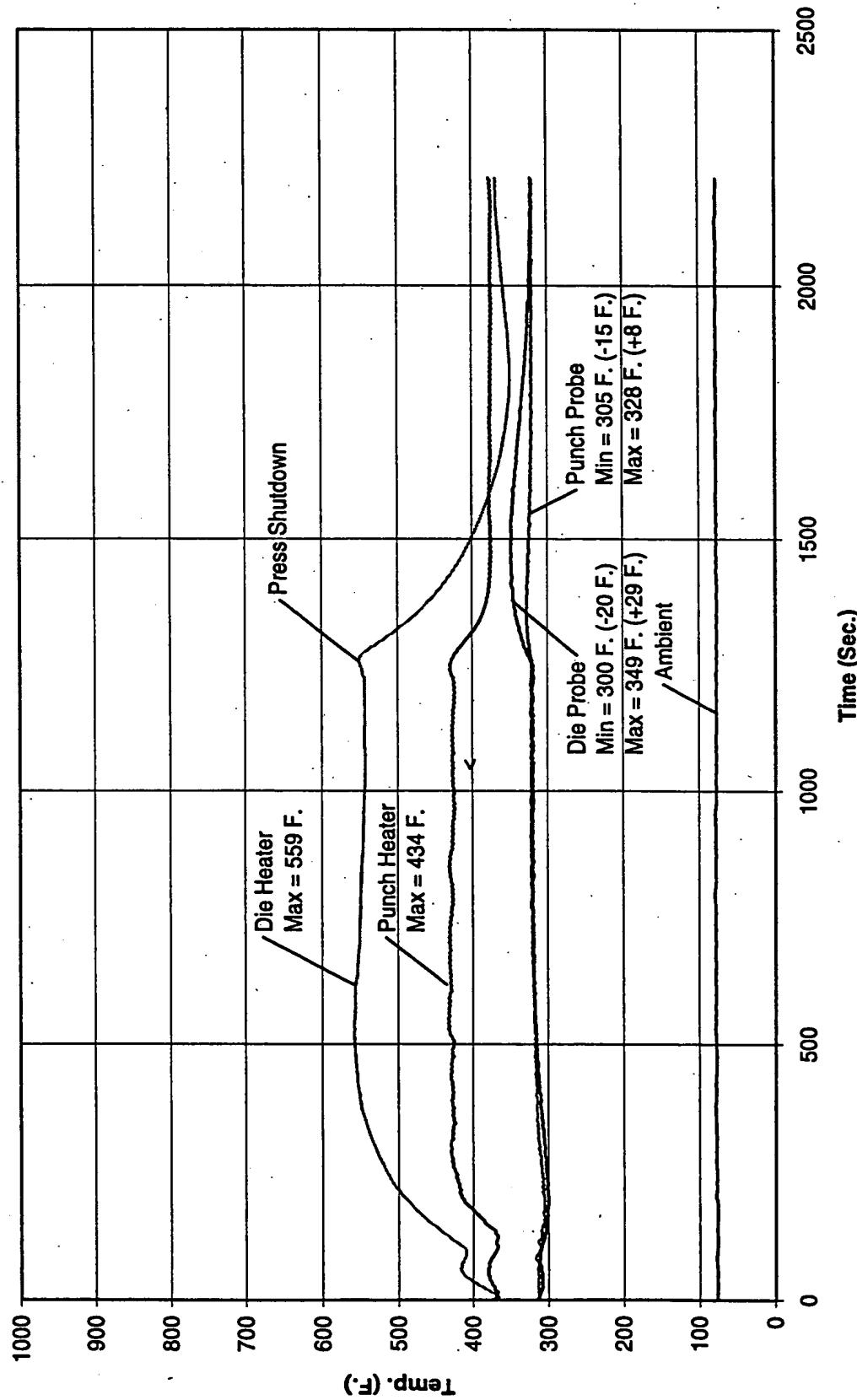


Fig. 18

Cast-In Heaters - 320 F. Std. Heat Up

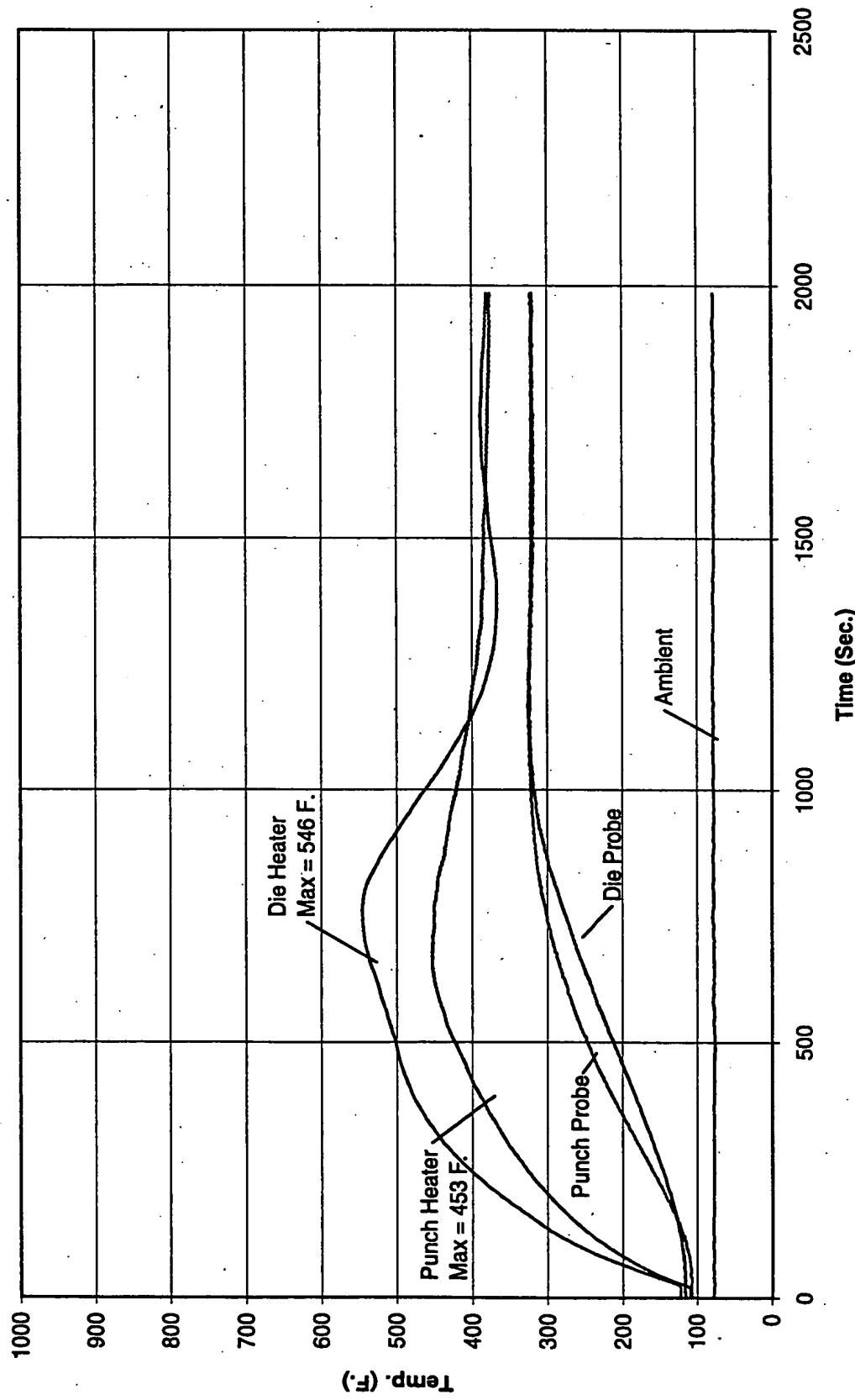


Fig. 19

Case #1: 3 Ring Heater System

Ring Heater Life (Months)	# Ring Heaters Per Die Set	# Cast Heater Per Die Set	# Die Sets per Press	Average # Ring Heater Fails/year	Break Even # Cast Heater Fails/year	Break Even Cast Heater Life (Months)
1	3	2	5	180.0	65.8	1.8
2	3	2	5	90.0	32.9	3.6
3	3	2	5	60.0	21.9	5.5
4	3	2	5	45.0	16.5	7.3
5	3	2	5	36.0	13.2	9.1
6	3	2	5	30.0	11.0	10.9
7	3	2	5	25.7	9.4	12.8
8	3	2	5	22.5	8.2	14.6
9	3	2	5	20.0	7.3	16.4
10	3	2	5	18.0	6.6	18.2
11	3	2	5	16.4	6.0	20.1
12	3	2	5	15.0	5.5	21.9
13	3	2	5	13.8	5.1	23.7
14	3	2	5	12.9	4.7	25.5
15	3	2	5	12.0	4.4	27.4
16	3	2	5	11.3	4.1	29.2
17	3	2	5	10.6	3.9	31.0
18	3	2	5	10.0	3.7	32.8
19	3	2	5	9.5	3.5	34.6
20	3	2	5	9.0	3.3	36.5
21	3	2	5	8.6	3.1	38.3
22	3	2	5	8.2	3.0	40.1
23	3	2	5	7.8	2.9	41.9
24	3	2	5	7.5	2.7	43.8

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Case #2: 4 Ring Heater System

Ring Heater Life (Months)	# Ring Heaters Per Die Set	# Cast Heater Per Die Set	# Die Sets per Press	Average # Ring Heater Fail/s/year	Break Even # Cast Heater Fail/s/year	Break Even # Cast Heater Life (Months)
1	4	2	5	240.0	107.7	1.1
2	4	2	5	120.0	53.9	2.2
3	4	2	5	80.0	35.9	3.3
4	4	2	5	60.0	26.9	4.5
5	4	2	5	48.0	21.5	5.6
6	4	2	5	40.0	18.0	6.7
7	4	2	5	34.3	15.4	7.8
8	4	2	5	30.0	13.5	8.9
9	4	2	5	26.7	12.0	10.0
10	4	2	5	24.0	10.8	11.1
11	4	2	5	21.8	9.8	12.3
12	4	2	5	20.0	9.0	13.4
13	4	2	5	18.5	8.3	14.5
14	4	2	5	17.1	7.7	15.6
15	4	2	5	16.0	7.2	16.7
16	4	2	5	15.0	6.7	17.8
17	4	2	5	14.1	6.3	18.9
18	4	2	5	13.3	6.0	20.1
19	4	2	5	12.6	5.7	21.2
20	4	2	5	12.0	5.4	22.3
21	4	2	5	11.4	5.1	23.4
22	4	2	5	10.9	4.9	24.5
23	4	2	5	10.4	4.7	25.6
24	4	2	5	10.0	4.5	26.7

F19.21

Cast Heater Break-Even Cost Analysis

